

The Deep River/ Turkey Creek Watershed Management Plan

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**City of Hobart , Indiana
414 Main Street
Hobart, Indiana 46342
(219) 942-6112**

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Developed for:

The City of Hobart, Indiana
Ms. Linda Buzinec, Mayor

Ms. Denarie A. Kane
Director of Development
414 Main Street
City of Hobart, IN 46342
(219)942-6112

Mr. Steve Truchan
City Engineer
414 Main Street
City of Hobart, IN 46342
(219)942-6112

Prepared by:



Goode & Associates, Inc.

Environmental Consulting
Watershed Coordination
Professional Staffing and Support Services



Steve Hall
Goode & Associates, Inc
5335 N. Tacoma Ave, Suite 6
Indianapolis, IN 46220
(317) 254-8235

Marianne Giolitto
J.F. New & Associates, Inc
708 Roosevelt Road
Walkerton, Indiana 46574
(219) 586-3400

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Distribution List – Watershed Plan Steering Committee

Salutation	First Name	Last Name	Representing
Mr.	Jeff	Greiner	Greiner Enterprises
Mr.	Greg	Bright	Indiana Lakes Management Society
Mr.	Pete	Julovich	Community Stakeholder
Ms.	Sandy	O'Brien	Community Stakeholder
Mr.	Craig	Zandstra	Lake County Parks Department
Mr.	Matt	Jarvis	IDEM/ NRCS
Mr.	Jeff	Ban	Crown Point City Engineer
Mr.	Stanley	Dobosz	Council Member, Town of Griffith
Mr.	George	Van Til	Lake County Surveyor
Mr.	Kevin	Breitzke	Porter County Surveyor
Mr.	Shawn	Pettit	Director of Operations, Town of Schererville
Mr.	Jerry	Kousen	Science Teacher, Hobart High School
Mr.	Steve	Fralish	Lake Station City Engineer
Mr.	Robert	Ellenberger	Council Member, City of Hobart
Ms.	Denarie	Kane	Director of Development, City of Hobart
Mr.	Taghi	Arshami	Planning Director, City of Gary
Mr.	Tris	Miles	Merrillville Town Engineer
Mr.	Craig	Hendrix	Portage City Engineer
Mr.	Steve	Truchan	Hobart City Engineer
Mr.	Chuck	Walker	Lake Co. District Conservationist
Mr.	Ron	Trigg	Shirley Heinze Environmental Fund

The Deep River/ Turkey Creek Watershed Management Plan

Executive Summary

The Deep River/ Turkey Creek watershed, identified as hydrologic unit coded (HUC) watershed 04040001030, covers a drainage area of approximately 124 square miles in northwestern Indiana, of which 104 square miles are located in Lake County, and 20 square miles are located in Porter County. The Deep River watershed covers a drainage area of 79.4 square miles and the Turkey Creek watershed covers a drainage area of 38.3 square miles. An additional 6.3 square miles drain directly to Lake George (Hoggatt, 1975).

The watershed encompasses areas of diverse land uses including significant agricultural areas in the southern portion of the watershed to predominately urban areas in the northern portion of the watershed. This region includes the communities of Hobart, Merrillville, Crown Point, and Winfield, Indiana, as well as touching upon small portions of other communities in the area, such as Griffith, Schererville, Gary, Portage, New Chicago, and Lake Station.

In the late 1980's, the City of Hobart, in partnership with a local private economic development organization, began a program to improve the community's quality of life and retain and expand business within the City that resulted in a multi-phased lakefront development and downtown revitalization plan. In the early 1990's, degrading water quality, recreational uses, and aesthetic issues began to pose a threat to the community's investments in lakefront and downtown revitalization efforts as a growing sedimentation problem in Lake George was becoming obvious. Accumulating sediments were precluding the use of the lake as a recreational resource for boating, degrading habitat for biological communities, and reducing recreational fishing opportunities in the lake. In addition, overgrowing plant life began to cause an aesthetic nuisance to lake residents and recreational enthusiasts.

As the result of community concerns, in 1993 the U.S. Army Corps of Engineers (USACE), Chicago District, initiated an extensive evaluation of Lake George and its major tributaries and later published a 1995 Planning/ Engineering feasibility report for the dredging of Lake George. The USACE report determined that the dredging of Lake George was feasible and economically viable. Consequently, in the spring of 2000 the City of Hobart proceeded with a limited dredging project for the lake. By the fall of 2000 the City had successfully removed more than 590,000 cubic yards of sediment from Lake George; however, the project was completed at a cost of more than two million dollars to the City of Hobart's taxpayers.

Since the success of the Lake George dredging project was achieved at a high cost to the community, officials with the City of Hobart began to evaluate potential options for protecting their public investments in the lake. As the City began to consider these options, it became apparent that in order to address the sediment loads to Lake George from the upstream tributaries of Deep River and Turkey Creek, there would be far reaching implications to achieving the desired reductions in sediment loadings.

In the fall of 2000, the City of Hobart applied to the Indiana Department of Environmental Management (IDEM) for a Section 319 Watershed Management Grant. During the summer of 2001, the City entered in to a contractual agreement with IDEM, and received 319 funding to begin the development of a Watershed Management Plan for Lake George and its watershed. The City of Hobart began formal watershed planning activities by forming a steering committee for the project, composed of a variety of stakeholders from throughout the Deep River/ Turkey Creek watershed. As a result of the concerns discussed by the Steering Committee and other stakeholders in the project, the committee decided on the following mission and goals for the project:

Mission: To minimize the introduction of sediment and other pollutants into Lake George by addressing local NPS issues and developing partnerships with neighboring communities, businesses, agricultural producers, and interested stakeholders.

Goals:

- Protect Lake George from future sediment and water quality impairments
- Improve water quality in Deep River/ Turkey Creek watersheds, upstream of Lake George
- Improve water quality education throughout the watershed
- Eliminate illegal discharges/ failing septic systems
- Promote consistency among communities developing stormwater programs

Watershed Approach

Although the study area for this project was originally focused on the Deep River-Lake George (HU 04040001030060) watershed in Hobart, Indiana, participants in this planning effort recognized from the beginning that the water quality issues discussed impacting Lake George could not be adequately addressed without significant actions to manage pollutant loads from the larger Deep River/ Turkey Creek watershed. Rather than limiting the focus and scope of this planning effort to developing specific recommendations for water quality improvements within the Deep River-Lake George watershed and the City of Hobart, this plan also provides additional recommendations for improving water quality throughout the larger Deep River/ Turkey Creek watershed and encourages the development of sub-watershed specific planning efforts.

In addition to understanding the fundamentals of watershed based planning, the project's Steering Committee inherently understood the challenges of working across multiple jurisdictions and the potential "turf" issues. In order to minimize these potential obstacles and build stronger partnerships throughout the watershed, the group recognized that the planning effort would need to establish and maintain a "shared" leadership structure and a unifying approach to tackling watershed wide issues. Consequently, although the grant for this project was applied for and received by the City of Hobart, the Steering Committee decided to title the project "The Deep River/ Turkey Creek Watershed Plan" to embody a truly watershed based perspective and to avoid association with only a single municipality within the watershed.

Summary of Findings

The water quality data evaluated for this project indicate that elevated concentrations/ loadings of nonpoint source pollutants are entering Lake George from both the Deep River and the Turkey subwatersheds as described below.

Deep River

In the Deep River subwatersheds, excessive pollutants, particularly total suspended solids, nutrients, and *E.coli* enter the study watershed from the upper portions of the Deep River subwatersheds. These findings appear to strongly correlate with the potential soil erodibility (T factor) ratings and the presence of significant highly erodible lands (HEL) in the subwatersheds upstream of the Deep River – Lake George subwatershed.

In addition, when these observations are compared to land uses, there also appears to be a strong correlation between the agricultural land uses that dominate the areas upstream of the study watershed and the elevated concentrations of total suspended solids and nutrients identified through this study. Based upon these observations, management of agricultural and HELs in the upper portions (subwatersheds) of the Deep River watershed should be prioritized for installation of best management practices (BMPs) for controlling erosion/ sedimentation and nutrients.

BMPs planned for this region should be coordinated with the strategies currently under development by the Lake County Surveyor's Office for stormwater management and regional detention in the Deep River/ Turkey Creek watershed. By coordinating these efforts for reducing the volume of water entering the creek and reducing pollutant concentrations, the overall goal of improving and protecting water quality in the Deep River/ Turkey Creek watershed should become more realistically attainable.

Based on the water quality data collected for this project, management of the Deep River watershed should be prioritized due to the greater pollutant loadings being contributed to Lake George by this watershed.

Turkey Creek

In the Turkey Creek subwatersheds, *E.coli* concentrations appear to be the pollutant of most concern, as monitoring indicates both dry and wet weather violations, as well as the highest overall concentrations of *E.coli* (highest geometric mean) per IDEM's monitoring. Since both IDEM's monitoring and the monitoring completed from this project showed the highest concentrations of *E.coli* to be from upstream of State Road 53, an evaluation of land uses in this area seems to indicate that the *E.coli* measured at this site were generated from primarily urban or residential land uses.

Instream habitat ratings for the Turkey Creek subwatersheds suggest that channel modifications have diminished the ability of Turkey Creek to support viable biological communities. Habitat improvements within the subwatershed of Turkey Creek should result in measured improvements in fish and macroinvertebrate community scores.

Lake George

Although multiple lakefront redevelopment projects have transformed Lake George into a significant natural resource in downtown Hobart, Indiana, the lake is still plagued with poor water quality due to the NPS pollutant loads that the lake receives from Deep River and Turkey Creek. In addition to poor incoming water quality, the lake harbors a tremendous volume of historically deposited sediments in its upstream wetland areas. These sediments appear to become resuspended in the lake during significant rainfall events, further prolonging recovery of Lake George.

In 2000, dredging efforts removed nearly 600,000 cubic yards of sediment from the lake in a successful effort to improve the usability of the lake; however, additional shoreline stabilization efforts are a necessity for maintaining the depth of the lake, as well as the integrity of the City's public parklands. In addition, posted speed limits on the lake need to be more stringently enforced to minimize the affects of wave erosion on the lake's shoreline.

Streambank Erosion

Residential lawns line the banks of Deep River, Turkey Creek, and Duck Creek. Consequently, bank erosion exists at many of sites along these streams due to manicured turf grasses that lack the ability to stabilize the streambank due to their shallow root structures. In streamside areas, turf grasses should be replaced with deeper rooted herbaceous and shrub species. In open canopy areas there are a variety of low profile prairie species that will provide better bank stabilization while still allowing residents to view the river. In shadier areas, savanna species or native shrubs may be more appropriate. In addition to stabilizing banks, buffers around the creeks would filter overland pollutant runoff. Additional bank stabilization should be also considered for channelized areas of the creeks where the banks are unstable.

Floodplain Protection

The reduction in storm total suspended solid loads and many of the nutrient loads between sites 6 and 8 of the monitoring completed for the project suggests that the Deep River is depositing some of its pollutant loads in the floodplain during storm events. As a result, the riparian zone and floodplain areas between these sites are functioning and should be protected. Other areas in the creek's corridor should be examined to identify additional functioning riparian zones for potential protection or riparian zone restoration. In some cases, grade controls and bank reshaping may be necessary to reconnect the creek with its floodplain.

A functioning riparian zone will, in many cases, sequester nutrients and sediment better than on-line wetlands such as the one upstream of Lake George. Many of the same management techniques listed as applicable for the upper Deep River watershed can be applied to areas upstream of State Road 53 in the Turkey Creek subwatersheds and within the Deep River/ Turkey Creek watershed itself.

Stormwater Management

The magnitude of construction and development within the watershed has exacerbated historical problems associated with erosion and sedimentation in Lake George. Consequently, implementation of stormwater management programs by municipalities, especially local erosion and sediment controls, is seen as a necessity for addressing a portion of the significant NPS pollutant load reductions for sediment within the urbanized portions of the Deep River/ Turkey Creek watershed.

Principles of Watershed Management

Although the watershed planning efforts in the Deep River/ Turkey Creek Watershed grew out of community concerns for Lake George, stakeholders involved in the development of this watershed plan realize that initiating water quality improvements in Lake George will require a significant investment of time and resources throughout the larger Deep River/ Turkey Creek watershed.

Generally speaking, watershed management approaches can be divided into two categories: the "quick-fix" approach or "long-term management". Long-term watershed management considers all of the factors affecting a watershed and sets a higher priority on finding comprehensive, lasting solutions to water quality problems. As a result, high quality, financially efficient management projects take time and begin with long-range planning, such as the efforts documented in this plan. In some cases, immediate stream or lake restoration practices are also necessary; however, good management planning will ensure that such immediate restoration efforts are followed by appropriate long-term management practices.

Water Quality Priorities, Goals, and Targets

Based upon this principle of watershed management, a mix of preventive actions and immediate restoration efforts are included in the recommendations for the

Deep River/ Turkey Creek watershed. As a result of the priorities, goals and targets decided upon by watershed stakeholders, a “toolbox” of structural and non-structural management practices have been developed by the consulting team and presented to Steering Committee for the Deep River/ Turkey Creek Watershed Plan.

The complete list of preferred management practices, in order of priority and as selected by watershed stakeholders, is included in **Table 8-2** of this plan. The final recommendations were compiled and organized into the content of the watershed plan and presented in this “Final Draft” version to the Hobart City Council and the public on June 19, 2002.

With approval by the Hobart Board of Works, officials with the City of Hobart intend to apply for additional 319 grant funding in 2002 in order to begin implementation of these recommendations. The City of Hobart looks forward to working further with the Steering Committee and additional stakeholders in the Deep River/ Turkey Creek Watershed towards achieving the mission of this planning effort, which is “to minimize the introduction of sediment and other pollutants into Lake George by addressing local NPS issues and developing partnerships with neighboring communities, businesses, agricultural producers, and interested stakeholders.”